

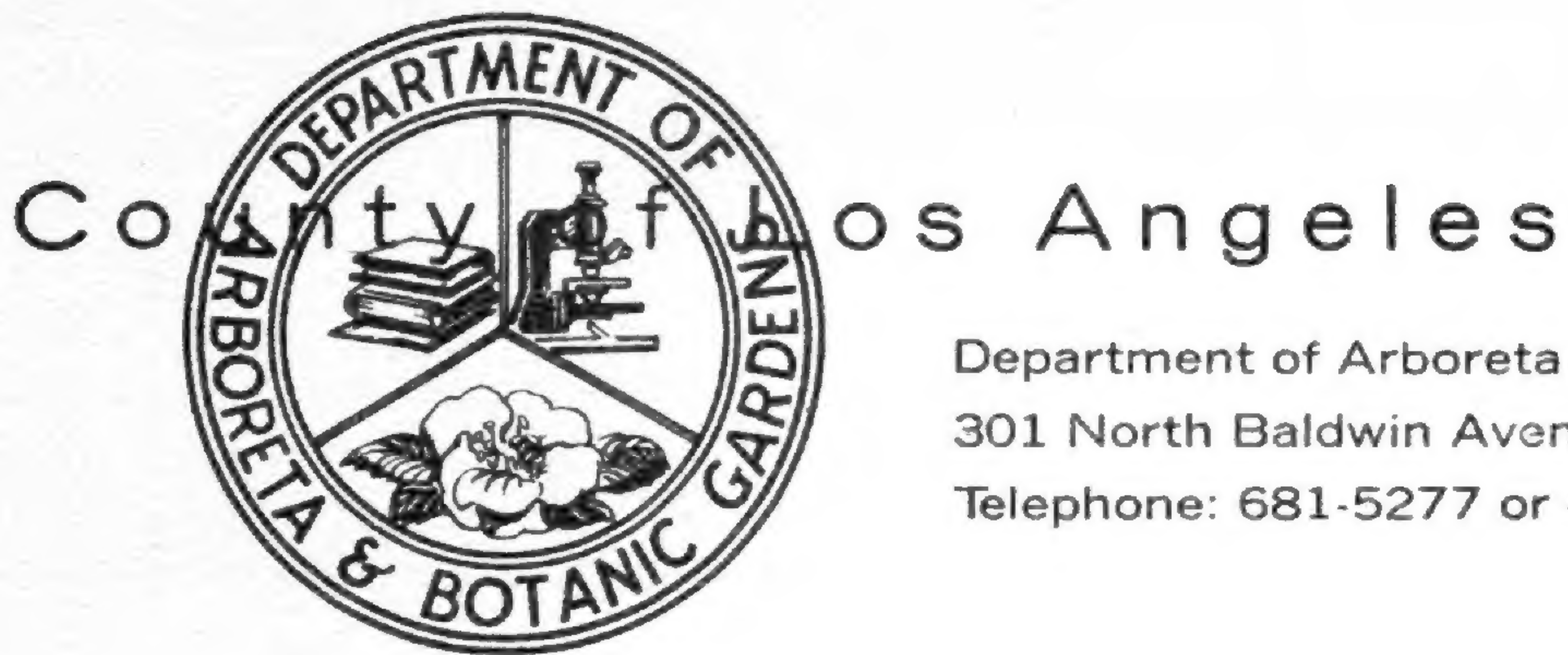


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Gentlemen:

Comparison of this report for 1963-65 with the 1961-63 report will show significant progress in the development, functioning, and use of the three major facilities operated by this department. The attendance this past year of nearly one million people in itself does you credit for having seen fit to establish and maintain this department.

Your appointees to the Board of Governors have rendered outstanding public service not only by their consideration of management policies at the regularly scheduled Board and Executive Committee meetings but also through their concern for special projects at each of our facilities. Some of these are: Arboretum Entranceway, Arboretum Eating Pavilion, Flowering Tree Booklet; Descanso Tea House; and, waterfall, greenhouse, and Quarterly Bulletin at the new South Coast Botanic Garden.

Falling in step with the Governors are the Trustees of each of the incorporated, nonprofit, citizens organizations supporting the activities at each of our facilities. These are: the California Arboretum Foundation, Inc.; Descanso Gardens Guild, Inc.; and, the South Coast Botanic Garden Foundation, Inc. A partial list of the numerous and varied contributions of these groups is given herein. These organizations, in turn, function as co-ordinating agencies for many of the County's numerous horticultural societies who generously and unselfishly contribute to the department. For example: the Southern California Unit of the Herb Society of America at the Arboretum; the Los Angeles Camellia Council at Descanso Gardens; and, the Inglewood Dahlia Society at the South Coast Botanic Garden.

It is apparent that, through the dedicated efforts of these countless men and women, the people of the County profit many times beyond the actual budget dollars allocated to the department.

It is these public spirited individuals that must be applauded and recognized for their role in making possible the staff accomplishments reported herein.

Respectfully submitted,

William S. Stewart
Director

WSS:lj

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About the Covers

- Front - This composite picture represents the most recent aerial views of the Department's three major facilities. The upper view is of South Coast Botanic Garden, Palos Verdes Peninsula area with a backdrop of Santa Monica Bay; the middle view is of the Los Angeles State and County Arboretum in Arcadia; and the lower view is of Descanso Gardens located on the slope of the San Rafael Hills in La Canada.
- Back - Trams take the visitor on a scenic, informative, yet relaxing ride through the sylvan setting of Descanso Garden's camellia and native oak forest to the Hospitality House (in background) where art exhibits are on continual display.

PART I. Operating Divisions

ARBORETUM DEVELOPMENT

The Entranceway Forecourt area, under development since 1960, is the major improvement at the Arboretum during the past two years. The area between the Gateway and Bauer Pool has been re-graded, drains installed and permanent hybrid Bermuda lawns are now well established.

The area immediately north and west of the Bauer Pool has been graded and lawns established. An automatic sprinkler system was installed thus reducing the Gardener's watering time.

By far, the greatest single improvement has been the mature tree moving program initiated a year and a half ago. This program was made possible by constructing an "A-frame" and fitting it to an existing five-ton truck equipped with a winch. During 1963-64 twenty-six large trees were moved from elsewhere on the grounds to the Entranceway Forecourt. Included in this group were: Acacia pendula, Ficus rubiginosa, Tabebuia eximia, Araucaria bidwillii, Chorisia speciosa (2), Pittosporum phylllyraeoides (2), Erythrina poianthes, Populus alba (3), Podocarpus falcata, Jacaranda acutifolia, Melaleuca linariifolia (2), and Prunus blireiana. In addition to the foregoing trees, the Arboretum also was able to acquire a Podocarpus gracilior in a five-foot box, a thirty-year old Erythrina crista-galli and three large Juniperus chinensis cv. 'Torulosa'.

Timely construction of the "A-frame" also allowed the Arboretum to accept a fine collection of five different species of Magnolia and seven large Camellia plants all, approximately fifteen to twenty years old.

During 1964-65 the following trees (46) were moved from various areas on the grounds and planted in the Entranceway areas:

<u>Acacia pendula</u> (2)	<u>Aesculus carnea</u> (1)
<u>Chorisia insignis</u> (2)	<u>Lagerstroemia indica</u> (1)
<u>Erythrina falcata</u> (1)	<u>Melaleuca linariifolia</u> (2)
<u>Erythrina coralloides</u> (3)	<u>Tabebuia chrysotricha</u> (2)
<u>Cassia leptophylla</u> (1)	<u>Metrosideros kermadecensis</u> (1)
<u>Cassia multijuga</u> (1)	<u>Caesalpinia peltophoroides</u> (1)
<u>Cassia excelsa</u> (1)	<u>Ficus fairchildiana</u> (1)
<u>Quercus robur</u> (1)	<u>Ficus macrophylla</u> (1)
<u>Bischofia trifoliata</u> (1)	<u>Quercus laurina</u> (1)
<u>Bauhinia blakeana</u> (1)	<u>Lagerstroemia indica</u> (11)
<u>Cornus macrophylla</u> (1)	<u>Lagerstroemia fauriei</u> (4)
<u>Olea europaea</u> (1)	<u>Chorisia insignis</u> (1)
<u>Ficus sycomorus</u> (1)	<u>Chorisia speciosa</u> (1)
<u>Ficus rubiginosa</u> (1)	

Oak trees (34) of various sizes and species were moved from their former location on Tallac Knoll to just south of the native stand of Engelmann oaks to create an "oak forest" and to have the oak collection all in one area.

Future plans for the Entranceway include replanting of additional tree specimens as well as installation and expansion of existing automatic sprinkler systems.

NURSERY

The primary function of the Nursery is the growing of introduced plant material in various sized containers from the time they leave the Propagating Unit until they are ready to be field planted. The Nursery Unit also is responsible for selecting and transporting plants to field locations and for maintaining an adequate supply of plants for replacement purposes.

This unit also is responsible for providing container grown specimens for the following areas: Home Demonstration Gardens greenhouse, Seminar Room patio, Gatehouse planter, "Queen Anne Cottage" and Carriage House. It also has supplied plants for decorative uses during special events at the Los Angeles County Museum as required.

Specimens are grown for various occasions and much knowledge has been gained in the production of particular container plants such as dahlias, delphiniums, tree chrysanthemums, dimorphotheca, osteospermum, ranunculus, sweetpeas, pansies, Iceland poppies, etc. which are not normally grown in containers.

Other projects during the past two years are:

1. New soil mixes have been formulated, tested and implemented resulting in advantages in handling and caring for plants in the nursery as well as at field planting time. Less maintenance per plant is required now to produce quality plants.
2. Trials have been in progress for over a year to determine the advantages and values of "long-term" fertilizers in soil mixes. Results to date have been favorable. If further trials verify these results, the use of long-term fertilizers in soil mixes will reduce the time required to fertilize container grown plants.
3. "B-995", a chemical growth retardant, was tested on a limited scale. Results indicate that this chemical used on marguerites and chrysanthemums will reduce the amount of hand labor necessary to produce quality specimens.
4. A year and one-half ago a project was initiated to determine methods of rooting cuttings of Calothamnus validus (native of Australia) for introduction as this plant is an erratic seed producer. Initial results were variable but by December, 1964 there was a sufficient quantity of plants available to allow introduction. In the latest trials 100% of cuttings have rooted in less than three weeks. Results of this project will be published.

PLANT PROPAGATION

The Plant Propagating Unit has been consolidated into a more compact entity to provide for greater efficiency in the handling of plant introductions, maintenance, operation of greenhouses, and special projects.

During the past two years the Arboretum received 3,160 accession of seed, plants, cuttings, etc. compared to 2,062 for the previous term.

Besides maintenance and operation of the two large propagating houses, this unit also is responsible for the maintenance and operation of other growing houses such as the Begonia, Plant Pathology, Plant Quarantine, and the Hibiscus House.

Construction and installation of a new mist propagating bench has enabled this unit to produce a larger quantity of rooted cutting material in a shorter amount of time than previously. The first mist propagating bench was such a success that a second mist bench was installed and a third bench will be added as soon as funds are available.

Success of the new mist benches has allowed initiation of a program to study means of rooting cuttings of plants that: (1) do not readily root by ordinary methods; (2) do not produce seed; (3) produce seed but do not germinate; or, (4) produce seedlings which have large amounts of variation. To date, preliminary results indicate that cuttings of Cassia splendida, Kunzea sericea, Viburnum macrocephalum, and a number of species of Grevillea can be successfully rooted.

Since 1963, the following plants were introduced by the Arboretum to the nursery trade:

Cassia leptophylla

Cassia excelsa

Cassia surattensis var. suffruticosa

Calothamnus validus

Tabebuia chrysotricha

Agapanthus 'Queen Anne'

SERVICE

This section now completes a greater number of projects through consolidation of its diverse work force, greater efficiency, and by the acquisition and construction of labor saving equipment.

- A. Utility Tractor Operators: Tractor operators have been responsible for advancing the development of the Entrance Forecourt area by major grading of these areas through use of existing and borrowed equipment. This has allowed immediate development at minimal cost.

With acquisition of a tractor drawn Mott mower, tractor operators have been able to assist in large scale mowing of rough lawn and meadow areas as well as aiding in the weed control in most sections. Previously, nearly all weeding was done by hand. The Mott mower also has greatly reduced the time needed to verti-cut lawns in the Entranceway areas. This is now done on a regular basis.

During the past year the tractor operators have aided replanting of the area south of the Administration Building and in development of an additional section of the Herb Garden. Their other duties include: maintenance of jeeps and trams; repairing and installing sprinkler systems; maintenance of Gateway and Bauer Pools; street sweeping using a mechanically operated sweeper; sowing vetch and alfalfa for winter ground cover preparation; grading of areas to be planted or developed; aiding in tree moving operations; and, in the construction and installation of fences, props, and similar structures.

- B. Turfs and Grasses: Despite the fact that the allocated man hours per week was reduced from 200 hours to 128 hours, all lawn areas have been maintained in good condition although an additional three acres of formal lawn areas have been installed in the Forecourt during this past term. Mowing crews also are responsible for edging all lawns adjacent to roadways and for the maintenance of special lawns in the Rose Garden and Historical sections.

- C. Equipment Maintenance Section: Regular duties involve checking and maintaining all power-operated equipment of the Division. They also maintain buildings and grounds as required. In addition, the Equipment Maintenance Section has been instrumental in planning and/or constructing the following special projects:

1. Display panels and benches for the Turfgrass Research Section.
2. A-frame for moving large trees.
3. Remodeling of Mist Propagation Bench and construction of a second unit.
4. Rebuilding tram.
5. Planning and installing of automatic pop-up sprinkler system for Forecourt area.
6. Construction and installation of partitions, desks, cabinets, shelves, etc. for office areas.
7. Planning and constructing of a 2,500 sq. ft. Saran cloth shade structure for the Camellia Research Project.
8. Planning and constructing special displays for flower shows.

- D. Research Projects: During the past two years the Research Section has expanded its staff as well as its projects thus necessitating assistance in such matters as growing, watering, weeding, feeding of plants, maintenance and operation of greenhouses and equipment, construction of special items such as shade structures, drying racks, beehives, show cases, and vented hoods. The following are some of the projects which are now in operation and which the Division has aided:

Camellia Research	Air Pollution Research	Jacaranda*
Cotton Research	Fire-Resistance Plants	Albizzia*
Turfgrass Research	Cassia sp.*	Eucalyptus*
Hibiscus Breeding	Callistemon*	Lagerstroemia*

*Irradiated and Colchicine Treated Plants

- E. Special Events - Flower Shows: During 1963-65 there have been 23 flower shows as compared to 13 flower shows during the previous two-year period. These required labor for setting up, dismantling and general assistance.

Arboriculture Section: This Section received the added responsibility of moving large trees and shrubs. The Arboretum was donated ten rare palms of various sizes from the Wright Estate in Riverside. All digging, boxing, moving, planting and staking of large trees was done by this Section. General cultural care of existing trees remains their most important function. The following itemization is an account of major duties performed at both the Arboretum and Descanso Gardens:

	<u>No. Trees</u>		<u>No. Trees</u>
Deep Watering and Feeding	1,745	Trees Trimmed	3,939
Trees Removed	891	Trees Topped	386
Trees Sprayed	16,184	Trees Staked and Tied	204
Truck Loads of Brush		Truck Loads of Stumps	
and Clippings Removed	203	Removed	86

In addition, over 1,500 lbs. and 276 gallons of insecticides have been used at both installations to maintain control of the myriad of pests harmful to native oaks and other trees.

Gardening Units: Some of the cultural practices initiated or expanded are:

1. Tensiometers - The results obtained from the use of tensiometers in 1961-63 were so impressive that additional stations have been installed. Advantages gained by the use of tensiometers are:
 - a. Plants are watered only when needed, thus providing for optimum growth conditions.
 - b. Watering frequencies are reduced which provides a savings in money, water, and most of all, time.
 - c. A 7-10 day forecast on water requirements is possible.
2. Mulching - During the past year, "islands" consisting of groups of plants have been established by removing grass and weeds from a given number of plants in close proximity to each other and by mulching this bare area with redwood shavings or rotted stable manure. The mulch, beside being of benefit to the plant, also is desirable as mowers need not spend time mowing closely to the plants, and gardeners can readily control weeds through the use of herbicides.
3. Fertilizing - A regular once a year fertilization program initiated in 1963 has been primarily responsible for improving plant quality. Most formal lawn areas are fertilized twice a month from May through October. Rough lawn and meadow areas are fertilized four times a year while young trees and shrubs are fertilized once a year during the early spring.
4. Weed Control - Within the past year, three new herbicides have been approved for field use. Two are contact sprays while the third is a pre-emergence spray with post-emergent qualities. The use of these herbicides has reduced the weed problem.
5. Pruning - The practice of pruning and shaping of plants while they are small has been initiated and is of benefit since the plant is then able to develop fully in a minimum amount of time without the need of additional pruning.
6. Renovated and Replanted Areas:
 - a. Both the Old Fashion Rose Garden and the rose garden at the "Queen Anne" cottage were renovated this past winter. All plants were removed, the soil excavated to a depth of eighteen inches, the bottom of the beds scarified, a new soil mix high in organic matter placed back into the beds, the rose plants replaced, and a mulch four inches deep applied. The appearance of the roses was enhanced this spring.
 - b. Annual and perennial beds surrounding the "Queen Anne Cottage" have been renovated and replanted. Previous problems involving compacted and poorly drained soil have been corrected by adequate soil conditioning.

- c. The vineyard at the Hugo Reid Adobe was renovated by trellising all of the vines and by adding a thick layer of mulch for weed control and moisture conservation.
 - d. A "Simples Garden" was added to the Herb Garden complex and work was started on a Shakespearean Garden.
7. In early 1964 the area south of the Administration Building was renovated and re-landscaped. The Rosemary, originally planted, was producing a leggy and ragged growth. This planting was removed, the area regraded and re-planted with Osteospermum fruiticosum. In addition, two specimen trees of Chorisia speciosa, three Prunus blirieana, two Cassia leptophylla and one Erythrina coralloides were planted.
 8. During the past two years a total of 3,934 plants were planted in the various geographical sections in connection with the Plant Introduction Program. These plantings are exclusive of many flats of bedding plants, ground covers, bulbs, shrubs, etc. that are planted to provide annual beautification and for landscaping.



Planting of a rare specimen of Palm (Erythea Brandegeei var. Spiralis) which was donated to the Arboretum. Note the specialized tree moving equipment necessary.

DESCANSO GARDENS

Attendance for 1963-65 was 745,845 compared to a 1961-63 attendance of 569,055, a 31% increase. These increases are the result of the success of various and numerous special events.

Projects have been:

Festival of Garden Lights and Fountains: This outstanding attraction for the visitors during 1963 was held during the entire month of July. There were over 70,000 visitors. The central areas of the Gardens, located near the Entranceway and in among the oaks and camellia shrubs, were transformed into a garden of lights, fountains, waterfalls, patios, and artistically landscaped garden settings. The latest developments in garden lighting equipment were displayed. Home owners obtained ideas on lighting that they could easily and practically apply to their own gardens.

New Access Road to the Descanso Hospitality House: The Hospitality House, a meeting place for many educational and social functions held at Descanso Gardens, is situated on a hillside in the southeast corner of the grounds. To reach the house by car, visitors formerly travelled a one-way road for over 1,500 feet, which also was used by the trams. To provide for greater safety and avoid confusion a new road was installed along the eastern boundary of the Gardens thus forming a circular route. The roadway has resulted in a time savings in regulating traffic, and also has increased the fire protection for the Hospitality House.

New Water Main from the Mountains: Descanso Gardens is fortunate to have a continuous supply of high quality water from natural springs located in Hall-Beckley Canyon in the mountains above La Canada, north of the Gardens. In past years this water was brought to the Gardens in old deteriorating pipes laid in the Southern California Edison right-of-way many years before. For this privilege rent was paid annually and the entire mile and one-half area maintained free of weeds. During the last fiscal period a new 6" iron pipe was installed in the public street eliminating all future repairing and cleaning of the right-of-way with the additional advantage of an increased volume and pressure of water.

Native Plant Garden: An additional one-fourth mile of nature trails, two paved roadways complete with two new stone and concrete tile bridges. Other improvements include an attractive rest area constructed amidst the redwood grove and known as "Redwood Rest." Many added shrubs and plants were planted as well as 152 trees which will become a valuable educational addition to this already scenic area.

Lucy Hester Camellia Garden: A total of 47 new camellia plants were received as donations from Mr. K. O. Hester. This particular area is becoming one of the most beautiful sections within the Garden and reflects many of the new introductions to the camellia collection.

Special Events and Flower Shows: Although Descanso Gardens is beautiful and scenic the year around, of special interest to the visitor are the many special events.

Event		Attendance	
		1963-64	1964-65
Coleman Concert	Evening	-	400
Arbor Day	Daytime	640	2,022
Glendale Chrysanthemum Show	Daytime	3,606	6,042
Christmas Show*	Daytime	-	15,729
Rose Pruning Demonstration	Daytime	1,975	2,000
Camellia Show	Daytime	19,161	23,355
Daffodil Show	Daytime	11,055	17,841
Three Native Plant Lectures	Evening	297	300
Night Lighting Festival*	Evening	76,479	-

*(Biennial events - Christmas Show and Night Lighting Festival held on alternate years.)

Other special events held at the Gardens include a display of beautifully stained glass windows installed at the Hospitality House during the Christmas season of 1963 and a group of carolers who sang Christmas music on the entrance lawn adjacent to the Administration Building. Both of these groups were sponsored by the Descanso Gardens Guild.

On April 24, 1964 ground breaking ceremonies were held heralding the long awaited construction of a teahouse donated by the Descanso Gardens Guild -- another example of a private citizens group working with a governmental department to improve a facility used by all the citizens.

Other Improvements: Several hundred feet of waterproofed underground electrical conduit were added as a donation from the Guild, thus enlarging the area available for the Night Lighting Display and other special events. Many donations of bulbous and plant materials were received and planted. These have enhanced the beauty of the grounds; particularly notable was an all American Selection Gladiolus Display Garden created from bulbs donated by Davids and Royston Bulb Company. Other plantings included 160 new roses, over 70 azaleas, and 3 magnolia trees. Additional donated ferns and other shade plants were used to brighten and beautify a small dell area just off the main tram road. The Camellia Garden was expanded with reticulata camellias being placed in areas receiving almost full sun. In the forest area additional azalea beds were constructed and planted with new varieties.

For several years Armillaria mellea, "Oak-root Fungus," has taken its toll of the Garden's old and stately native oaks. In an attempt to prevent the destruction of the "Forest" and at the same time to find trees that are resistant to this fungus. Podocarpus gracilior, Shamel Ash, Cupaniopsis and Magnolia trees have been planted to test their resistance to the fungus. Results during the last two years are promising and indicate that the forest can be preserved.

Other improvements include the addition of donated waterfalls and pools in various locations of the grounds. The Cymbidium Orchid area, located near the Hospitality House, was increased by the gift of 48 choice plants. This area was made more accessible with the installation of a new path with steps leading to the main tram road.

The Hospitality House was used extensively by over 100 different organizations in 1963-64 and by 81 in 1964-65. In addition to garden clubs and horticultural societies that regularly use this facility, lectures and adult classes were held here, and 24 art exhibitions of one month each.

Finally, the U. S. Forestry Service in cooperation with the County Flood Control District was instrumental in the construction of 8 erosion check dams located on the Department water-shed property in Hall-Beckley Canyon. These will stabilize the soil in the canyon and provide level ground for plant growth. A natural gas line was installed from Descanso Drive to serve the Children's Education and the Service Buildings. This eliminates the need for propane gas and provides a more efficient and safe means of heating these buildings. In the service ward, a 500 gallon underground gasoline storage tank was installed.

Introductions: Fifteen new hybrid lilacs (Syringa vulgaris) developed at Descanso Gardens during the previous ten-year period were officially introduced to the nursery trade and have been distributed to 14 nurseries throughout California. These lilacs have been anxiously awaited and will be most readily accepted by the homeowner since they can be successfully flowered in the warm southern California climate.



Spring color in the form of annuals, camellias, and azaleas, blossom forth underneath a stand of native oaks near the tram loading area at Descanso Gardens.



Leisurely crowds view the 1965 Camellia Show located adjacent to the central lawn promenade within tranquil Descanso Gardens.

EDUCATION

Adult Education Section: Adults seek a knowledge of plant culture and care. The following statistics show their interest and enthusiasm:

	Classes Arboretum Unit		Classes Descanso Gardens Unit	
	1963-64	1964-65	1963-64	1964-65
Attendance for 28 weeks	3,891	2,489	2,106	2,384
Subjects taught	10	6	4	4
Separate classes	15	10	8	8
Registered students	417	243	241	198
Total Registration (both Units for 2 years)			1,099	
Total Attendance (both Units for 2 years)			10,870	

Radio: In addition to formal classes, a series of radio programs were produced on home gardening and horticultural highlights. The programs were pre-recorded at the Arboretum and played over the air by two local radio stations as public service features. Station KMAX-FM Sierra Madre, carried 38 half-hour programs and Station KRKD, Los Angeles used 16 quarter-hour programs.

Gardener School: Training for future employment in horticulture is the objective of the Gardener School. During its four years of operation this school has graduated twenty-five students. Half of this number are now employed in horticulture or are continuing their education.

The students are in session half of each weekday for 44 weeks and are given the opportunity to learn all the skills basic to the culture and management of plant materials. Training is provided through classroom and practical field experience. A Certificate of Completion, a copy of the School Program and a letter of recommendation is awarded each student on graduation day.

Physically Handicapped: The Roosevelt School of Pasadena increased its use of a garden plot for handicapped children at Descanso Gardens. In 1963-64 total attendance was 752 children and 88 adults. In 1964-65 total attendance rose to 984 children and 213 adults. Mrs. Milbank, member of Descanso Gardens Guild, continued her volunteer services in coordinating and assisting the activities of this school program.

Educable Mentally Retarded: ("EMR") A Garden Skills pilot program involving 17 Junior High EMR (Point 1) students from Monrovia School District was undertaken at the Arboretum's Youth Education Center. The program included 26 class periods, 39 hours of instruction, 22 hours teacher conferences, and 36 hours of preparation. Tests were included to evaluate the progress of the student's experience.

Fifteen EMR students from the San Gabriel School District were given a short course of similar work as part of a comparison program.

A fully documented-illustrated report was prepared which included curriculum and results of this educational program. This report was requested for study by: Palo Alto School District, Stanford's Children Hospital, Foster Botanical Garden, Hawaii, and Kew Gardens, England.

To our knowledge, this program is the only serious attempt in using gardening for therapy of both physically and mentally handicapped children currently in progress on the West Coast.

Educational Statistics:

	<u>Arboretum Unit</u>		<u>Descanso Gardens Unit</u>	
	1963-64	1964-65	1963-64	1964-65
<u>Formal Instructional Classes</u>				
Subjects	13	16	10	10
Classes	36	36	25	24
Students Registered	633	540	385	346
Cities Represented	20	19	4	6
<u>Arbor Day Commemoration Program</u>				
Number attending	1,450	1,600	700	1,200
Number of tree seedlings given	1,684	1,400	551	1,000
Number of tree booklets	1,000	1,400	551	1,000
<u>Leadership Classes</u>				
Institute Sessions Adult Attendance	58	60	--	--
Youth Leadership Workshops	36	28	22	16
Youth Group Conducted Tours	105	297	--	--
<u>Special Elementary Grade Field Trips</u>				
Attendance	19,663	20,760	5,413	5,409
Number of cities represented	70	78	24	15
<u>Volunteer Assistance</u>				
Hours, number of	420	586	--	106

South Coast Botanic Garden: Education programs here are steadily developing. In 1963-64 the Youth Education Section furnished tree seedlings and booklets for the 500 children attending Arbor Day Commemoration ceremonies. In 1964-65 the Education Specialist assisted in the planning of the Arbor Day program. Seedling trees and booklets were again supplied for over 600 children in attendance. The South Coast Botanic Garden Foundation sponsored both Arbor Day programs.

During 1964-65 the Education Specialist prepared a field trip outline and trained two volunteer field trip leaders at the Garden. The Los Angeles City Schools Supervisor of Science and Gardening scheduled five school field trips as a pilot program from the Harbor and South Los Angeles areas. The number of trips will continue to be minimal until planting displays and trained Tour Guides are available.

Historical Section: During 1964-65 the elementary school level Special Field Trip in History, lead by the Associate Curator, Tour Guides or Docents, gave approximately 14,000 children a real life experience of the years from 1830 to 1900. This period covered the era from Hugo Reid, the first land owner and lord of the ranch to E. J. "Lucky" Baldwin.

Changing exhibits within the Carriage House appealed to all ages. Imaginative titles as: Textiles and Costumes; Horses in History and Art; Great Fairs of the West; California's Vanishing Yesterdays and Pioneers Abroad, recapture through paintings, dress, implements, letters, maps and numerous other artifacts, the hard won victories in the development of California and in particular the San Gabriel Valley area.

For each exhibit, the Curator authored a special illustrated brochure explaining each exhibit and gave background facts which unified the portrayed story.

Permanent exhibits recently completed and located in the Carriage House are: The Blacksmith Shop, Saddles West and Early Farm Tools.

Preservation: Some of the physical improvements in the Historical Center have been: a) Full decontamination of costumes, furnishings, items of fur, wool, feather and basketry through cooperation with the Los Angeles County Museum.

- b) Installation of better lighting in the Queen Anne Cottage.
- c) Improved painted surface for porch of the Queen Anne Cottage.
- d) Restoration of the Wickiup houses and construction of a protective rail fence around three of the houses.
- e) Repainting of Adobe House and patio walls for protection against decay by wind, rain and sun.
- f) Replanting of flower gardens, the Old Fashion Rose Garden and lawns surrounding the Queen Anne Cottage.

Volunteers: The Historical Center, as with other activities of the Department attracted interested volunteers to assist the Curator, outstanding among these has been Mr. Bruce Wetmore. All of these volunteers, both adult and children, merit special mention. They have often engaged in difficult but authentic restoration practices and performed maintenance work around the historical buildings. The children cared for and fed several burros kept in the Adobe's corral.

Library Section: Balwant Rajput College, Agra, India received a gift from the Library of the California Arboretum Foundation. Nine large cartons of duplicate books on horticulture, botany and agriculture were shipped.

Gifts: Among gifts of note were: Fill-in numbers of 'Floricultural Cabinet' (54), bound 'Nature' (15), and 'Natural History'; a new set of Bailey's Cyclopedia of Horticulture; small gifts of money to be used for specific book purchases from three private individuals.

Use: Average monthly patronage of Library facilities was 221 for 1963-64 and 250 for 1964-65. There has been steady and continued increase in use of reference materials by junior colleges and colleges in the Los Angeles County area.

Holdings: Since the 1961-63 report our Library has increased its holdings of cataloged items from 12,763 to 14,430 and of uncataloged items from 10,687 to 12,136. Prominent among our acquisitions have been the completing of all volumes of "Flora Australiensis," the set of "Loddiges' Botanical Cabinet," the set of "Flores de serres et des jardins de l'Europe," and the peacock-pertinent "Pheasants, their lives and homes" by Beebe.

Information Section:

Gift: Radio stations KPOL and KHJ as well as KNBC-TV gave the Department the equivalent of \$6,382.00 air time in the form of spot news announcements during 1964-65. For this, the Department wishes to express its thanks through this Report for these gifts and to all other radio and TV stations giving us such service each year.

Department Attendance: Tour Guides, who act as hosts for the Department, greeted thousands of visitors - local citizens, those from out of state and an ever increasing number of foreigners interested in horticultural achievements:

	<u>1963-64</u>	<u>1964-65</u>
Arboretum Attendance	473,845	481,079
Descanso Gardens Attendance	380,301	365,539
South Coast Botanic Garden Attendance	3,526	8,196

Flower Shows: Flower shows required the services of the Information Section who provided news releases, advice on traffic patterns, safety precautions, special tram tours, and directional information. Flower shows accounted for the following portion of total attendance:

<u>Events at Arboretum</u>	<u>1963-64</u>	<u>1964-65</u>
Begonia Show	5,022	5,256
National Begonia Show	-	10,646
Turf Show	4,885	10,082
Fall Flower Show	11,571	7,896
Orchid Show	7,397	-

Camellia Show Temple City	7,484	7,689
Iris Show	8,573	5,939
Epiphyllum Show	6,721	4,461
Geranium Show	7,752	8,355
Rose Show	8,127	-
Gladiolus Show	6,796	7,000
Spring Flower Show & Art Festival	-	9,902
Bonsai Show	-	9,973
Grand Total Attendance	74,328	91,722

Figures for flower shows held at Descanso Gardens appear under that section of this report.

School Field Trips: Tour Guides are trained in conducting School Field Trips and in this capacity function as an adjunct to the Youth Education Section. Field Trips at the Arboretum cover five subjects: Plant Science, Insects, Weather, Nature and Conservation, and History. At Descanso Gardens one field trip, Nature and Conservation, is available. Attendance figures for this activity are given under the Youth Education Section.

Other Services: Information Window; audio-visual set-ups of projection and public address systems; special tours for distinguished visitors; assisting California Arboretum Foundation and Descanso Gardens Guild with their sales and program activities; preparation and installation of features 'Plant of the Week' display.

Education Service Section: Repeatedly, a single illustration has focused attention on and evoked favorable acceptance of a program sponsored by the Department. The skill of the Staff Artist contributes in a large measure to the success of the many educational endeavors at the Arboretum, Descanso Gardens and South Coast Botanic Garden.

During the two years, 1963-65, the following examples of the Education Service Section are worthy of notice; 30 colorful flower show posters; color renditions of architectural drawings of the Japanese Tea House at Descanso Gardens; illustrations and architectural drawings for Descanso Gardens Native Plant Committee Lecture series; line drawings of insects for the Pest Control brochure compiled by the staff Entomologist; drawings and graphs for the Research Division's Publications; line drawings illustrating flowering trees used in Los Angeles Beautiful's 'Flowering Trees of Southern California' booklet; multilith master drawings for use on the many brochures used by the Department, the California Arboretum Foundation, the Descanso Gardens Guild and the South Coast Botanic Garden Foundation in connection with their programs and special activities.

Honor was paid the Staff Artist by the Hunt Memorial Botanical Library, Pittsburgh, Pennsylvania. A set of his original drawings of orchids is now a permanent record and on display there.

Botanical sketching classes for adults at the Arboretum and Descanso Gardens continued under the instruction of the Staff Artist.

Historical Center: New accessions. Material received had an appraisal value of approximately \$12,000. The new items included: costumes, mechanical arts materials, archival photographs, documents, Indian artifacts, books, glass, china and ceramics.

Education Division Staff Activities:

Chief, Education Division: Represented the Department at St. Louis, Missouri as Chairman of the Education Committee for the American Association of Botanical Gardens and Arboreta and was appointed Chairman of the Education Committee for the American

Horticultural Society. Served six months as Assistant Director for the University of Michigan Botanical Gardens, Ann Arbor, Michigan. Produced 38 tape recorded, half-hour radio programs for KMAX-FM, Sierra Madre and 16 quarter-hour radio programs for KRKD, Los Angeles. Collected 12 quarter-hour tape recordings from arboreta and botanic gardens within the United States which will soon be made into a master tape program for circulation. Conducted a nation wide survey of education programs of other arboreta and botanic gardens. This survey will form a report to professional societies as well as a guide for enhancing the quality of our Department's educational programs. Appeared on NBC-TV "World of Ornamentals," subject, Horticultural Education. Appeared on Los Angeles City Schools TV program on "The Plant Kingdom."

Youth Education Specialist: Acted as plant science advisor for Science and Gardening Supervisors of Los Angeles City Schools on several occasions; supervised and coordinated a new summer school program for La Canada Intermediate School consisting of a six weeks pilot program of a Science Outdoors Class held at Descanso Gardens. Represented the Department for the last two years on the Pasadena Community-wide Conservation Committee. Appeared on NBC-TV program 'World of Ornamentals' subject, "Youth Education." Appeared on Los Angeles City Schools TV series, subject "Trees." Featured speaker at California State Garden Clubs, Inc. Annual Convention 1964, subject, "Junior Gardening," over 200 hours each year was spent as speaker and instructor for Los Angeles City Schools, San Gabriel Valley School Districts, garden clubs, teacher institutes, youth group leader organizations, special field trips, etc.

Associate Curator-History: Arranged for meetings at the Arboretum of the Archeological Survey Associates of San Gabriel Valley and the Arcadia Historical Society. Represented the Department at: Western Museum League Conference 1963; Western History Association Conference 1963; Riverside Conference Historical House Museums and Societies 1964. Lectured for: Los Angeles City College Educational TV; Los Angeles Main Library History Division; Palm Springs Historical Society; Arcadia Coordinating Council; Lummis House; El Monte Historical Society; Women's City Club Pasadena, Archeological Institute of America. Taught several sessions of Youth Education Program known as the 'Indians and Rancherias.'

Librarian: Became a member of the National Special Libraries Association, Los Angeles Chapter. Published an article on the Arboretum library in the Special Libraries Association Bulletin. Met with area librarians and assisted with plans for local observance of National Library Week. Compiled a list of 1500 representative books on the Library's shelves plus a compilation of a catalog of the periodical collection. Assisted with the cataloging of the Library being assembled by the South Coast Botanic Garden Foundation.

Photography: A Tour Guide from the Information Section of Descanso Gardens was assigned as a part time staff photographer. He made all black and white photos required by the Department, processed the film and printed pictures on request. Requests were received from the Education Division, Research Division, California Arboretum Foundation, Descanso Gardens Guild, South Coast Botanic Garden Foundation, for photographs used in connection with documentation, public programs, flower shows, reports, etc.

Television: The Director together with Dr. Mildred Mathias, University of California Botanic Gardens Director prepared and presented a series of fifty-two weekly half-hour television programs. These were taped and televised, in color, by KNBC Channel 4 as a public service. Nearly the entire series was then repeated. The programs were produced by Mr. Edward J. Kay of Vidaudio, Inc. Program titles were:

- | | |
|---|--|
| 1. "International Language of Flowers" | 31. "Race Track Plantings" |
| 2. "California Wild Flowers From Here to There" | Guests: Mr. Tommy Thompson
Mr. John Ratekin |

3. "Ornamentals From There to Here"
Guest: Mr. Morgan Evans
4. "Why Plants Grow Where They Do"
5. "Skyline Ornamentals"
6. "California Mission Gardens"
7. "Hobby Plants (Bonsai)"
Guest: Mr. John Catlin
8. "The Gold Rush"
9. "Fads and Fancies"
10. "The Tropical Look"
Guest: Mr. Philip Chandler
11. "California Beautiful"
Guest: Mr. William Armstrong
12. "Cities Beautiful"
Guest: Mrs. Valley Knudsen
13. "Old Fashioned Roses"
Guest: Mr. John van Barneveld
14. "The Disneyland Story"
Guest: Mr. Morgan Evans
15. "The Huntington Botanic Garden"
Guest: Mr. William Hertrich
16. "Modern Roses"
Guest: Mr. John van Barneveld
17. "Flowering Trees Around the World"
Guest: Dr. Samuel Ayres, Jr.
18. "Ground Cover Plants"
Guest: Mr. James Perry
19. "landscaping Industrial Sites"
Guest: Mr. C. M. Deasy
20. "Garden Writers"
Guests: Dr. Robert Atkinson and
Mr. David Gilfillan
21. "Ornamental Fig Trees"
Guest: Dr. Ira C. Condit
22. "Landscape U.C.L.A."
Guest: Mr. Ralph Cornell
23. "Knott's Berry Farm"
Guests: Mr. Walter Knott and
Mr. Don Coulter
24. "Research on Ornamentals"
Guest: Dr. Hary C. Kohl
25. "Flower Seeds for the World"
Guest: Mr. Howard Bodger
26. "Botanic Gardens of the World"
27. "Flowers for the House"
28. "Pruning Ornamental Plants"
Guest: Dr. W. H. Chandler
29. "Eucalyptus"
30. "Plants of the Angeles Forest"
Guest: Mr. Sim Jarvi
32. "Children's Gardens"
Guest: Mrs. Gertrude Woods
33. "Ornamental Plants of South Africa"
34. "Landscaping Shopping Malls"
Guest: Mr. Millard Sheets
35. "Arboretum Story"
Guest: Mr. George Spalding
36. "Industrial Landscape Maintenance"
Guest: Mr. Milton Slade
37. "Horticultural Education"
Guest: Dr. Louis N. Martin
38. "Flower Shows"
Guest: Mr. Victor Pinckney
39. "South Coast Botanic Story"
Guests: Mrs. Frances Young and
Mr. Donald Woolley
40. "Ornamental Plants of Australia"
41. "Fire Resistant Plant Research"
Guest: Dr. Robert Gonderman
42. "Descanso Gardens"
Guest: Mr. Mark Anthony
43. "Plant Collecting in Peru"
44. "Plant Collecting in East Africa"
45. "Fifty Years of Horticulture in
Southern California"
Guest: Mr. Lovell Swisher
46. "Orchids"
Guest: Mr. Glenn Hiatt
47. "Plants We'd Like You to Know"
Guest: Mrs. Elsa Uppman Knoll
48. "Garden Clean-up"
49. "Trees of Santa Monica"
Guest: Mr. George T. Hastings
50. "Conservation and Ornamental Plants"
Guest: Mrs. Elna Bakker
51. "Christmas Plants and Legends"
Guest: Mr. Elmer Lorenz
52. "Garden Therapy"

RESEARCH

Fire-Resistant Plants: Project studies on fire-resistant plants have received major emphasis during the last two-year period, with emphasis on erosion control. The following species of fire-resistant plants are recommended:

Atriplex lentiformis

Atriplex Breweri

Atriplex canescens

Atriplex semibaccata

Achillea tomentosa

Baccharis pilularis, 'Dwarf'

Cistus hybridus

Cistus ladaniferus

Cistus villosus

Eriodictyon trichocalyx

Helianthemum nummularium

Psoralea bituminosa

Rosmarinus officinalis prostratus

Santolina virens

Research is continuing on field seeding methods. These are being approached through new seeding media such as tar paper planting disks. Initial studies indicate that tar paper disks provide conditions for germination that enable young plants to compete with native plant materials. In addition, the disks can be placed on steep mountain slopes inaccessible by foot but readily accessible to helicopters. Assistance in this work has come from the San Gabriel Valley Women's Clubs who have made the tar paper plant disks.

The fire-resistant plant program has received added emphasis as its importance and concepts gain recognition from Federal, State and local agencies. Others interested in this project are local fire departments, landscape architects, the Brush Fire Safety Committee, housing developers, fire insurance agencies, and civic improvement groups. The Brush Fire Safety Committee published and distributed 200,000 pamphlets titled "Fire-Resistant Plants" based on the Arboretum research project. Information has been disseminated on fire-resistant plants by speaking before 62 interested groups as well as by distributing mimeographed information sheets and participating in television appearances or some 68 written magazine and newspaper articles. An educational film entitled "Greenbelt U.S.A." is now being shown extensively throughout the United States and presents some of the research work that the Arboretum has accomplished on the fire-resistant plant concept. Another film documenting the Arboretum's work on fire-resistant plants was edited for TV and shown to various groups for educational purposes.

Turfgrass Research: The second Plant Physiologist is in charge of maintaining the various experimental turfgrass plantings including 34 permanent turf exhibition plots. He assists with two turfgrass shows a year.

Turfgrass Research Projects have included studies on the following:

1. Automatic irrigation control.
2. Improved management practices for hybrid Bermuda grass, Dichondra and other lawn grasses.
3. Research and selection of turfgrass that will remain green during winter months.
4. The development and use of selective herbicides for control of crab grass, Dallis grass and Kikuyu grass.
5. The effectiveness of Diphenamid and "Dalapon" as selective herbicides for grass control. The use of Sodium thiocyanate for the oxalis control in lawn grass or dichondra plantings.
6. The effect of smog injury to hybrid Bermuda grass.
7. Studies on the use of fertilizers, soil amendments, and soil penetrants for lawn care.

"Operation Green Carpet" was initiated in the spring of 1964 to promote interest in the development of superior turfs and home lawns, as well as to provide a means for dissemination of turf information. Attendance was 10,000 for the Saturday and Sunday event. It was established in cooperation with the University of California Agricultural Extension Service and the Southern California Turf Grass Council. The latter representing the turf grass industry of this area. Subsequent to "Operation

Green Carpet" biennial Spring and Fall Lawn Expositions for the home gardener had been held. These shows featured demonstrations on lawn building, development, and maintenance, and have included rather extensive displays and samples of commercially available equipment and materials used for lawn care.

In conjunction with Operation Green Carpet, "Better Lawns Week" was initiated during the spring of 1965 and received an official proclamation by the Los Angeles City Council. Visitors to the demonstration turf grass plots, where over 30 varieties of lawn grasses are grown for the information of the public, has steadily increased and now numbers about 100 daily, and over 1,000 on week-ends. During the last fiscal year more than 1,000 persons received individual help on lawn problems.

An educational display on the identification of turfgrass varieties was developed and displayed at the following locations: Fourth Annual Materials and Equipment Exposition, Brookside Park, Pasadena; University of California Agricultural Extension Nursery, Landscape Tree and Turf Conference, Riverside; and at the Third Annual Spring Home Lawn Exposition, Arboretum.

Herbarium: Approximately 5,000 herbarium specimens have been collected or otherwise added in this biennium; currently, total holdings of the LASCA Herbarium are now in excess of 25,000 specimen sheets and other reference materials. Special collections of research specimens have been provided, or referred, to both foreign and domestic arboreta and botanic institutions.

Herbarium activities have emphasized the identification and validation of field collections and processing these for final disposition; concomitantly, duplicate sheets among the collection sets have been prepared for exchange with herbaria of comparable interests.

The filing system for collections has been completed. All herbarium cases were sorted and readied for insertion of specimen sheets. "Worked" specimens have been catalogued and filed, thereby becoming available for immediate reference use. In addition, a fumitorium and storage room for new and exchange collections was prepared and placed in operation.

With the full and effective assistance of the staff gardeners and Plant Records Office, an inventory of the field plantings was prepared for reference. This 82-page report contains the identification number and name, and also notes the relative maturity, location and quantity of most accessioned plantings throughout the Arboretum. The inventory provides a convenient collation of field plantings for staff and public use in locating particular plants, indicating special groups receiving emphasis, gaining an awareness of represented materials, and suggesting complementary acquisitions; it also functions in other staff requirements. Regular supplements are anticipated to maintain a current record.

Additional extension services have included plant identification and related assistance or information to large numbers of home gardeners, students, teachers, commercial gardeners, nurseries, various civic agencies and others. It is estimated that more than 2,500 such requests or contacts have been served in this biennium. Frequent staff consultation regarding taxonomic and related matters also has been provided.

The current Arboretum Seed Exchange List of 308 items, along with a covering explanatory letter, was sent to more than 435 various plant-science institutions and other contacts in 70 countries. In addition, detailed correspondence and exchange requests have been concentrated on contacts in areas of particular promise or interest regarding plant introductions. The response to this has widely increased liaison with sources of potential value, especially within Asia and some other regions that have been relatively unrepresented or quite out of contact in prior years.

Around 4,000 requests for seed and plants have been placed with other institutions or private sources. Receipt of ordered exchange items average less than half, how-

ever, an estimated field survival of introductions reduces this by at least half again. Nonetheless, the contribution to a basic plant-introduction program has continued to be a major one. Three criteria guide request selections; ornamental potential, taxonomic significance and collection balance. Taxonomic research on ornamental taxa of horticultural importance or promise within Southern California necessitates the establishment of reasonably complete plant collections of groups scheduled for eventual study.

Plant Taxonomy: As a public service this office has regularly identified plant materials, brought or sent in by high school and college students, teachers, home owners, nurseries, law enforcement agencies and the general public. It is estimated that 6,000 specimens were identified during the last two-year period.

The Plant Taxonomist represented the Department at meetings of the American Institute of Biological Sciences, Boulder, Colorado, 1964 and the Pacific Division of American Association for the Advancement of Science, Riverside, California, 1965 where he presented a paper on the "Problems of Plant Identification." He also regularly teaches classes in "Plant Identification" for both the Professional Gardeners' School and Adult Education Classes at the Arboretum.

Plant Records Unit: Seed Control and Labelling Statistics:

<u>Accessions</u>	<u>1963-64</u>	<u>1964-65</u>
Accessions	1,814	1,392
Seed planted	963	1,191
Cuttings inserted	5,048	6,117
Plants moved to one-gallon cans	4,034	5,571
Plants moved to five-gallon cans	29	12
Plants moved to permanent field locations	2,998	393
Aluminum labels, embossed	2,467	1,271
Fiber glass labels, laminated	451	479

Weather Data for the Two-Year Period:

<u>Date Recorded</u>		<u>1963-64</u>	<u>Date Recorded</u>	<u>1964-65</u>
Lowest Temperature	12/12/63	32°	1/1/65	31°
Highest Temperature	9/25/63	112°	10/6/64	103°
Total precipitation	Annual	11.94 in.		16.48 in.
Total evaporation	Annual	46.34		48.02
Heaviest monthly rainfall	Annual 1/64	3.15 in.	4/65	8.75 in.

Of special interest is the increased seed exchange with foreign botanic gardens. There is now seed exchange with 135 foreign botanic gardens. Seed is sent to 32 Russian botanic gardens and to ten other Iron Curtain countries. In return seed was received from twenty of these countries, and since some of these botanic gardens are new, receipt of seed should increase as they mature in development. Also, by devious routes, a request for seed of Cupressus macrocarpa and Sequoia sempervirens was received from the Lu Shan Botanic Gardens in Kuling, Kiangsi Province, China. This is the first time contact has been made and seed exchanged with Red China.

Plant Breeding and Other Research: In a plant breeding project utilizing X-ray and neutron-irradiated seed of several genera, preliminary observations on germination and seedling survival indicate that the higher levels of neutron radiation were significantly harmful in only two test materials. In other instances where some injury was noted, the X-irradiated material appeared most affected in all but one case. Losses in only ten of the original nineteen taxa included in the studies remain and in most of these, the surviving populations are quite limited. Those that have survived are now well established in field test plots. Precocious flowering and growth response indicates an expected, but limited, increase in seedling variation which, in turn, eventually promises a relatively rich potential for improved horticultural selections from at least certain test materials.

Observations on floral biology and exploratory hybridization attempts were made in Calliandra, Cassia (in cooperation with the Geneticist) and Tabebuia. All crosses in Calliandra failed immediately. Those in Cassia eventually failed, but this loss was associated with a heavy drop of open-pollination legumes as well and failure in this case appears unrelated to the hybridization. The crosses between a purple-flowered and yellow-flowered species of Tabebuia were unsuccessful with pollen stored at room temperature; those where pollen stored at low temperatures was used are too recent for determination of results.

In reciprocal cooperation with C. R. Parks and the Camellia Research Advisory Committee, several associated studies on camellias and related taxa are in progress. This has also entailed concentrated effort to complement these particular plant collections by introduction and other means. Chemotaxonomic, cytological, morphological and anatomical approaches have been employed in this work. More than 150 species and cultivars, with emphasis on the section Paracamellia, have been chromatographed and otherwise studied. Basic analysis of the polyphenolic chromatograms is nearing completion. It is anticipated that these studies will lead to a better understanding of intrageneric relationships and taxonomic discrimination.

A relatively large population of F_2 seedlings from Camellia sasanqua 'Shishigashira' x 'Narumi-gata' has been grown for variation survey and potential selection. At present only half of the group has flowered; however, this material is marked by high flower and habit quality evident in the young plants. Several promising seedlings already have been tentatively selected for eventual introduction.

Entomology: Identification of insects referred by the gardeners and the general public, and assistance to those who request help on plant pest control problems have highlighted the work in entomology over the past two years. Periodic inspections were made of the Arboretum and Descanso Gardens to check on insect development which provided information for timely application of control measures and prevention of pest injury to plants, shrubs, and trees.

Observation hives of bees, with educational labels, are maintained at both the Arboretum and Descanso Gardens as a display for educational purposes. The Comstock world-wide collection of insects (on loan from the Los Angeles County Museum) also has been maintained for use in the Department's Educational program. Recently, a start has been made towards establishing a departmental collection of insects which will serve as an aid in identification as well as in teaching activities.

Entomological research has dealt mainly with the biology and control of the psyllid fly, Psylla uncatoides. Investigation has shown it to be a pest on nearly one-half of the more than 100 species of Acacia and Albizia trees growing in this area. This study has provided valuable information on controlling such pests with the use of systemic insecticides.

Plant Pathology: The Plant Pathologist has continued to diagnose specific disease problems for the public and to present classroom lectures to the Professional Gardeners' School students.

There has been continuing emphasis on studies on the control of oak-root fungus disease which is a serious threat to ornamental plantings in Los Angeles County, as it attacks many plant species in addition to oak trees. Efforts to control this fungus have included the testing of plants to determine possible resistance to the disease. Included in test plots at Descanso Gardens and the Lux Arboretum are plants representing fifty genera. Thus far, representative plants in seven genera (Brassia, Cassia, Cocculus, Euphorbia, Geranium, Nerium and Pinus) have become diseased. An investigation to determine whether longevity plays a role in disease resistance of our native oaks also is in progress.

Efforts are being made to find and evaluate systemic materials which move through the plant internally and destroy the fungus. At present, a controlled method of testing these materials has been devised and initial screening of compounds has begun.

Another program has been initiated to evaluate systemic fungicides in control of the palm rot disease which has been a serious menace to our native palm, Washingtonia filifera.

Air Pollution Research: The main objective of the research project, which is financed by the National Institute of Health, is to determine whether there is any means to protect plants from damage due to air pollution. During the past year, two substances have been tried which show some promise. One of these is a powder, gum guaiac, which when dusted on a few plants, has protected them from ozone damage. The other is propyl gallate which, when sprayed on a few plants as a weak water solution, protected them from ozone. More extensive studies of these materials must be made to determine their value for use outside the laboratory and on a wide range of plant subjects.

Atmospheric pollution has been measured at the Arboretum by two methods, chemical analysis and bio-assay. The first, chemical analysis for the total oxidant in the atmosphere, is performed semi-automatically on the hour between 8:00 a.m. and 5:00 p.m. daily. This has continued over a number of years using the apparatus originally designed by Dr. A. J. Haagen-Smit of the California Institute of Technology and presented by him to the Arboretum. A summary of the data obtained is submitted quarterly to the State of California for their records. The second method is by a "Bio-assay" by means of sensitive plants, using the method developed by the Air Pollution Control District. This has been used daily since March, 1964 and provides an arbitrary measure of phytotoxicants. It distinguishes between the various types of pollutants which damage plants.

Symptoms of air pollution injury to vegetation in Los Angeles County and in other parts of Southern California, have been observed and recorded. The two most critical pollutants causing damage to vegetation are ozone and peroxyacyl nitrate. Ethylene damage is of consequence to orchid growers and is most severe in coastal areas. The so-called "aerosol" injury has been observed in the vicinity of installations burning large quantities of residual fuel oil containing sulfur. Using chemicals known to be emitted from these sources, this injury has been reproduced on plants at the Arboretum. Localized damage due to hydrogen fluoride has been continuously observed in some areas.

Many introduced plants being studied at the Arboretum to determine their adaptability to this area have been carefully observed for their resistance to air pollution. These observations have emphasized the fact that very young plants are more sensitive than mature plants. If small seedlings could be protected by suitable filters until they had passed the critical stage, they could develop into mature plants, although they might never become completely resistant. In a number of cases, air pollution has been the major factor causing the death of young plants. Serious injury due to ozone has been increasingly observed on many mature shrubs and trees. Some of the more seriously affected are sycamore, silver maple, elm and locust. Camellia on the other hand, appears quite resistant.

Field trips have been made at the request of the Agriculture Commissioner's staff and of the Arboretum's plant pathologist to identify the cause of injury to crops and ornamentals. A number of talks have been given to local agricultural and horticultural groups and to college classes. Exhibits are regularly prepared for "Operation Green Carpet," held at the Arboretum. At least three conferences pertaining to air pollution have been attended. Many photographs, both in color and in black and white, have been used to record damage symptoms and areas of occurrence. One entire issue of Lasca Leaves was prepared on the subject of air pollution damage to vegetation, describing the findings of this project and reviewing previous studies in this field by the Air Pollution Control District.

Camellia Breeding - Plant Geneticist: Both from the greenhouse and from the laboratory come data which is helping us to better understand the biology and the taxonomy of the genus Camellia. In our program our major limitations are the long life cycle and the essential self-sterility of most species of the genus Camellia. These conditions limit the depth of genetic investigation that can be carried out. The ease of culture and the relatively high compatibility of most Camellia species partially compensate for these limitations. These assets make the Camellia a relatively good subject for

studies of the biology and genetics of a woody ornamental plant -- not to mention the well known great ornamental value of many of the species of this genus.

In general we can see definite progress in the areas of development of cold-hardiness and fragrance, while we are at least coming to better understand the problems involved in our efforts to widen the camellia color spectrum. The experiments being carried out to develop cold-resistant camellias are largely based on the co-operation project between the Arboretum and Dr. R. W. Lighty of Longwood Gardens, Kennett Square, Pennsylvania. Most of this program is based on the systematic inter-crossings of Camellia japonica cultivars which have performed well in the Longwood field tests. Our hopes for introducing fragrance into the camellia are still largely based on combinations with the species Camellia lutchuensis. First-generation hybrids with this species have bloomed to date, and the fragrance characteristic is carried to them. To a lesser degree other species are being used in this part of the project. If the small amount of yellow coloration in the species C. japonica can be increased, this will likely take at least two breeding cycles. Attempts to develop bluer shades in the camellia also have been carried out. Genetic analysis of Camellia japonica progeny is being done to determine the manner in which flower form and color characteristics are inherited.

Chromatographic Studies on Camellias: Chromatographic analysis, a micro-chemical approach, of camellia types is yielding considerable information regarding the taxonomic relationships of camellia taxa. We are completing a study of hybrid recognition by rapid chromatography. By this approach a large number of plants can be surveyed in a short time to determine if they have chemical components common to both of their parents. Thus far we have been able to show a large number of our hybrids intermediate. Mr. Malcolm McLeod of Pomona, California is carrying out this part of the work.

Our more involved and long term chromatographic task is the identification (as far as possible) and quantification of the polyphenolic substances of all of the Camellia species in cultivation. This information will tell us much about the inter-relationships of the species of the genus Camellia. This project is necessarily longer term.

Hibiscus Research: This project, established in 1957 with the objective of producing hibiscus cultivars better adapted to southern California conditions than those from Hawaii and other areas, was suggested by Mr. Ross Gast, Director at large of the American Hibiscus Society. He is collaborating with Mr. J. W. Staniford on the introduction and breeding of Hibiscus rosa-sinensis and allied species. In addition to their donations of time, Mr. Gast has travelled world-wide collecting hibiscus breeding material. He also has established a reserve fund with the California Arboretum Foundation, Inc. to purchase equipment, assistance, and defray shipping costs. A research greenhouse and outdoor planting area now are filled with hibiscus progeny from previous years crosses and with the introduced plants.

Several new hibiscus types have been developed within the last two years and soon will be introduced. Display and test plantings of these are now being located in various Los Angeles county and city parks.

The dedicated interest of these gentlemen is gratefully acknowledged and appreciated. They are designated "Research Associates" of the Arboretum.

SOUTH COAST BOTANIC GARDEN

The South Coast Botanic Garden is now a reality. With continuing enthusiastic support from the public clearly demonstrated in the form of donated materials, money, labor, interest and goodwill, the making of a beautiful botanic garden has emerged. During this last two-years all of the 87 acres of the land fill have been transferred to this Department by the County Sanitation District.

Plans have been completed and work started on the finish grade for the stream, waterfall, and lake. Fifty-thousand-dollars worth of ornamental rock has been donated and will be placed along the stream bed and lake. Capital expenditures have involved planning and installation of a permanent automatic water distribution system covering the first 43 acres of the Garden site. Other Capital Project work has included completion of a \$70,000 service building, shop, office, warehouse, and garage. The building was dedicated by Supervisor Chace on November 7, 1964.

Shortly thereafter the grounds were opened to the general public on Thursdays from 10:00 a.m. to 3:00 p.m. at which time the Supervisor conducts tours of the plantings and explains developmental progress.

With the addition of another Saran screen house for propagation purposes and, with refinements made to the previously constructed Filon house in the form of heating and cooling, many garden club groups, plant societies, and two colleges began to schedule meetings at these buildings. Most groups also requested that the Supervisor appear and speak at their meetings on anticipated development, plans, and the plantings.

In the latter part of 1963 a 4½ acre area, located immediately west of the propagation house, was seeded to vetch and clover after the soil had been adequately prepared and organic soil amendments added. Immediate soil preparation was necessary to hold the soil and reduce dust problems resulting from the prevalent offshore winds.

As indicated above there are problems in changing a dump site into a botanic garden. In order to follow the master plan, a soil building program was required immediately. The majority of the existing base soil is composed of diatomaceous earth of low nutrient level. This requires intensive soil development by additions of compost, fertilizers, redwood shavings and manure. Those areas that require longer time for plant growth must be initiated first in order to allow the trees and shrubs to mature and to establish windbreaks for ground covers that will stabilize the soil and reduce weed infestation. Other problems resulted from the large and numerous rocks which must be removed by hand whenever the soil is tilled. All routine maintenance problems are compounded by the fact that the surface of the entire Garden site is settling at different rates due to uneven decomposition and depth of fill material. Such subsidence has required more than normal maintenance of water systems, sprinklers, roadways, parking lots, trails, etc.

A permanent weather station was installed and its readings are now quoted weekly in three local newspapers giving temperature and rainfall data for the north side of the Palos Verdes Peninsula. This provides useful and valuable information for care and maintenance of plants and publicizes the Garden.

A propagation staff composed of three volunteers has germinated and pot-planted over 6,400 specimens the last 14 months. This donation of time has surpassed 950 hours.

Arbor Day, 1963 saw many notables in a group of over 600 visitors attending a special dedication program. This included two bands and a U. S. Marine Corps Color Guard in dress blues. They raised an American Flag flown over the White House and presented to the Garden by Representative Alonzo Bell, through contacts established by the South Coast Botanic Garden Foundation. As usual, seedling trees were given to children attending. The master of ceremonies for Arbor Day, 1964 was Harold Perry

("The Great Gildersleeve") who presided over a fine program of music and short speeches. Other notables included Supervisor Chace, mayors, and civic dignitaries who attended the tree planting and tree distribution.

The event which culminated this exciting period of Garden development was the second annual Flower Show held June 18, 19, and 20, 1965. This was attended by over 3,000 and represented 35 displays and exhibits by participating merchants, nurseries and individuals of the Palos Verdes Peninsula. Some of the more interesting displays included the Palos Verdes Begonia Firm, Sears, Rosedale Nursery and Perry's Plants.

DONATIONS: The following is a list of gifts accepted by the South Coast Botanic Garden:

1. Over 810 books, booklets, pamphlets, and brochures on horticulture from the year 1789 to the present were donated from the collection of the late Mr. George R. Martini.
2. Manure spreader (\$600.00 plus \$200.00 membership in South Coast Botanic Garden Foundation, Inc. from Bert Noble Foundation).
3. Various plant donations from individuals, nurseries, etc. in excess of 1,800 specimens.
4. A \$500.00 cash donation for flowering trees from Mr. Keiji Yata.
5. The Arbor Day Fund received \$625.00 from garden clubs, plant societies, and youth organizations.
6. Southern California Edison Company's continuing donations of 20-30 yards of tree chippings on a weekly basis since late 1964.
7. Various plant donations from individuals and nurseries for 1964-65 amounting to \$1,250.00.
8. Year 1963-64 saw funds given for youth activities in the amount of \$200.00 and \$2,500.00 by the Bert Noble Foundation to build a completely automatic greenhouse for propagation and use by children; \$4,160.00 worth of top soil, organic mulches, and fertilizer.
9. Specialized labor (\$600.00) for the grounds was paid for by Mr. Robert Noble.



Aerial view of facilities at South Coast Botanic Garden showing new Service Building complex completed in the fall of 1964 as well as Filon and Saran houses.

PART II. AFFILIATED NON-PROFIT ORGANIZATIONS

California Arboretum Foundation, Inc.

The California Arboretum Foundation, Inc. was incorporated in 1948 as a non-profit organization to support the continued development of the Los Angeles State and County Arboretum through public relations, private monies, gifts, and grants. From a nucleus of civic and horticultural-minded citizens, the membership of the Foundation has increased to over 600. The Board of Trustees is composed of twenty-five members. Officers for the coming year are: Mr. F. Harold Roach, President; Dr. Arie J. Haagen-Smit and Mr. Howard Bodger, Vice-Presidents; Mr. Howard Miller, Treasurer; and Mr. George H. Spalding, Secretary.

Government grants awarded the Arboretum staff for administration by the Foundation provided a wide scope of research. "Food Plant Preferences of Insects" was awarded by the National Science Foundation and "Air Pollution Effects on Plant Tissue" was awarded by the National Institutes of Health, the latter grant was in the amount of \$23,685.00, for a three-year period. From the Camellia Research Committee (Chairman E. C. Tourje, Vice-Chairman R. W. Ragland) numerous contributions were received to support research on Camellias with the objectives of increased cold-hardiness, fragrance and new flower colors.

Funds of \$29,500.00 were awarded for research on Gossypium (cotton) by the National Science Foundation.

A contribution was made by the Foundation to apply toward the purchase of an offset multilith duplicating machine for use at the Arboretum.

The Foundation participated as a joint sponsor with Los Angeles Beautiful and the Southern California Horticultural Institute in the publication of the booklet "Flowering Trees for Year-Round Color in Southern California," and are having a successful sale. Ten thousand copies were printed. Other publications of the Foundation are the quarterly "Lasca Leaves" for members and exchange with educational and botanical institutions over the world, as well as "The Arboretum Story" depicting the activities and plans of the Foundation. Three 16mm sound films were donated to the Foundation and are on loan to groups for programs.

Some of the varied and miscellaneous services provided through the Foundation for the visitors are:

1. Maintenance of trams for tours of the Arboretum grounds.
2. Periodic lectures by outstanding horticulturists and educators.
3. Special members' tours of the Arboretum grounds.
4. Joint sponsorship with outside organizations of flower shows and other special events.
5. Through the Special Events Committee of the Foundation, the Christmas Posada is presented to members, neighbors, and guests. This active committee contributes their time and efforts in decorating for lectures, Board of Governors meetings, flower show previews and assists in mailings and numerous other volunteer duties.

During the past two years the Foundation, through reserve and restricted funds, has continued to support such projects as:

1. The purchase of herbaceous plants for planting in the Herb Garden through donations by the Southern California Unit of the Herb Society of America.
2. Funds for repairs, cleaning and replacements of historical properties in the Queen Anne Cottage, Hugo Reid Adobe, and Coach Barn.
3. Joint monetary participation with Sunset Magazine to implement changes in the Home Demonstration Gardens.

4. Annual \$500.00 contribution to the Arboretum Library for purchase of rare books.
5. The Entranceway Development Project received funds through the Foundation to construct walls, walks, and plantings. The Bauer and McFie Pools were presented to the County of Los Angeles.
6. Provided funds for plant collecting in foreign countries.

Proceeds from Book Shop sales assist in supporting the activities of the Foundation.

With the growth of the Foundation in membership and activities, need for the Foundation building has become urgent. It is anticipated this building will house a gift and book shop, business office and eating facilities for the public. Working drawings are now being prepared. Thus far, \$30,000.00 has been contributed by donors, including requested memorial funds as well as proceeds from the sale of 160 orchid plants donated by the Dos Pueblos Orchid Company.

DESCANSO GARDENS GUILD, INC.

The Descanso Gardens Guild, Inc. continued its interest in the development of the Gardens with increased zeal during the last two years. Mrs. Judge Smith of Flintridge, was unanimously reelected President for both years.

Ground breaking ceremonies heralding the start of construction of the Tea House took place on April 24, 1965. Funds for construction and furnishings to the amount of about \$50,000.00 are being supplied by the Guild.

The Guild sponsored Christmas Home Decorating Display in the Hospitality House during December, 1964 was one of the highlights of the year.

A "Hunt Breakfast" honoring past owners of the land that now constitutes Descanso Gardens was attended by 220 guests.

The very successful Night Lighting Festival, July 1963 sponsored by the Guild, was viewed by 76,479 people.

Many hours of help was donated by members of the Guild in the "Handicapped Children's Garden."

A Coleman twilight concert was presented on September 20, 1964 in the west woods area to an enthusiastic audience.

DESCANSO GARDENS CALIFORNIA NATIVE PLANT COMMITTEE

The Descanso Gardens Native Plant Committee in 1965 suffered the loss of its able Chairman, Mr. Conrad Fanton. Two new members, Mr. Harold Ryan and Dr. Thomas Thorne, were added to this Committee.

Two stone bridges were constructed, roads paved and many new trees, shrubs and vines were planted under the direction of this Committee. Construction was started on a new rest area in the Redwood Grove.

THE LOS ANGELES CAMELLIA COUNCIL, LTD.

The annual spring Camellia Show at Descanso Gardens is sponsored by the Los Angeles Camellia Council, Ltd. which is composed of the Temple City, Southern California, Orange County, Pomona, Los Angeles and Pacific Camellia Societies. The 1964 show was attended by 19,961 and the 1965 display by 24,355 visitors.

Judge Bayard Rhone of Los Angeles was President of the Council in 1964 and Mr. Raymond R. Noyes in 1965.

A second Clark tractor to pull the jeep trains was donated as well as two circulating pumps for the new Descanso Show Garden. A brick and stone floor for the display Gazebo also was provided along with two new wheel chairs for use by visitors.

SOUTH COAST BOTANIC GARDEN FOUNDATION, INC.

The South Coast Botanic Garden Foundation, Inc., under the leadership of their President, Mrs. Frances (R. O.) Young now has a membership of 250. In addition to numerous activities such as publication of their quarterly bulletin, sponsoring flower shows, volunteer guides for Garden tours, volunteer help in the office, and plant propagating, etc. they have been responsible for the following gifts:

Rock for Lake and Stream	\$50,000.00
Display Building (Club House)	3,000.00
Plants of various kinds	13,738.00
Redwood Shavings	750.00
Fertilizers	8,300.00
Specialized labor paid by donor	600.00
Library Books and Files	5,100.00
Equipment	558.00
Volunteer labor (7313 hours, pro-rated at \$1.25 per hour)	9,141.25
Cash on hand or previously donated	<u>4,403.43</u>
Total donations including labor	\$95,590.68

The 8th National Accredited Trial Dahlia Garden is flourishing through the untiring efforts of the Dahlia Society with much of the specialized labor and materials furnished by the Society.



Descanso Gardens viewed either on foot or by a guided informative tram tour results in a peaceful yet beautiful understanding of nature.

PART III. PUBLICATIONS BY STAFF
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Boutin, F. C.

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Ching, Francis F. T.

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Enari, Leonid

- 1964 "Flowering Shrub Collections for Different Parts of the United States." Handbook of Flowering Shrubs: 34-57. (Brooklyn Botanic Garden, author.)

Griffiths, Austin, Jr. and C. R. Parks

- 1964 "Plant Introduction: Available Desiderata - Asiatic Theaceous Gordonieae." Lasca Miscellanea - 7. 59 pages. January.

Gonderman, R. L.

- 1963 "Fire-Resistant Plants." Western Landscaping News. 3(8): 4-17.
1963 "Fire-Resistant Plant Research Project." Los Angeles State and County Arboretum mimeograph. December.
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1964 "Fire-Resistant Plants in Park Maintenance." Park Maintenance. 17(2): 8, 18-21. February.
1964 "Availability List of Fire-Resistant Plants." Los Angeles State and County Arboretum mimeograph. April.
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Hiatt, Glenn H.

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Munro, J. Alex

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Noble, W. N.

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Parks, C. R. and Austin Griffiths, Jr.

- 1963 "The Saluenensis-Pitardii-Reticulata Complex." Cam. Rev. 25(2): 12-29. November.

Parks, C. R. and A. E. Longley

- 1963 "The long day of camellia breeding." Cam. Rev. Vol. 25, No. 1, 8-11, 21.

Longley, A. E. and C. R. Parks.

- 1963 Camellia breeding progress report. The 1964 American Camellia Society Yearbook. Edited by J. H. Pyron; Tifton, Georgia: 163-183.

Parks, C. R.

- 1964 Survival of the most fit. Camellia Review, Vol. 25, No. 3:12-14.
- 1964 Fingerprinting camellias. Camellia Review, Vol. 25, No. 4:22-23.
- 1964 The fingerprint in a case of disputed paternity. Camellia Review, Vol. 25, No. 6: 4pp.
- 1964 Comments on Camellia breeding. Camellia Bulletin, Vol. 17, No. 4: 4pp.
- 1964 Another year under lights. Camellia Review, Vol. 26, No. 1:20-21.
- 1964 An example of the use of chromatography in plant identification - hybridity of 'Charlean'. The 1965 American Camellia Society Yearbook, Edited by J. H. Pyron; Tifton, Georgia: 160-169.
- 1964 Camellia breeding progress report - II. The American Camellia Society Yearbook, Edited by J. H. Pyron; Tifton, Georgia: 206-225.
- 1965 Comments on Camellia breeding. Camellia Review, Vol. 26, No. 4:12-15. (Reprinted from the Aug. 1964 issue of the Camellia Bulletin.)
- 1965 Floral pigmentation studies in the genus Gossypium. I. Species specific pigmentation patterns. American Journal of Botany, Vol. 52, No. 3: 309-316.
- 1965 The genetics of camellias and the amateurs. Camellia Review, Vol. 26, No. 6:5pp.

Spalding, George H.

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- 1965 "Introduction Fraxinus uhdei 'Tomlinson'." Pacific Coast Nurseryman. 24(6): 60. June.

Stewart, William S.

- 1963 "A Californian's Impression of South African Vegetation." J. Bot. Soc. So. Africa, 49: 11-14.
- 1964 "Searching, sorting, selecting, trees and shrubs for the urban landscape." Proceedings of turf, nursery, and landscape tree conference. Univ. Calif., Davis. February 11, 12, 13. (Mimeographed)
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- 1965 "Hybridity detection: Review of analysis methods." (with Ebon C. Tourje) 143-151. The American Camellia Yearbook. Ed. by Joseph H. Pyron. American Camellia Society, Tifton, Georgia.

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- 1963 Biennial Report 1961-63. Los Angeles County Department of Arboreta and Botanic Garden.

Williams, H. Hamilton

- 1963 "A New Turfgrass Center for Southern California." Lasca Leaves 13(4): 75-81. Autumn.
- 1964 "Warm Season Grasses. In Lawns and Ground Covers." Revised edition of Sunset Lawn Book. Lane Publishing Company, Menlo Park, California. February.
- 1964 "Establishing and Maintaining a Perfect Lawn." Los Angeles State and County Arboretum. (Mimeographed)
- 1964 "Identification of Certain Genera of Turfgrasses Based on Vegetative Characteristic." Los Angeles State and County Arboretum. (Mimeographed)



Mr. Noble experiments on plants to determine their susceptibility to smog damage.



The Lucy Hester Camellia Garden represents a living memorial and makes an excellent setting for the visitor to view the latest camellia introductions.



"Operation Green Carpet" initiates the First Biennial Spring and Fall Lawn Exposition. Visitors observe commercial displays and in foreground are panels of ground covers available for use by the home owner.

PART IV. FINANCIAL REPORT 1963-65

Departmental Summary
1963-64

	<u>Appropriation</u>	<u>Expenditure</u>	<u>Balance</u>
Salaries and Wages	\$731,337.00	\$725,376.02	\$ 5,960.98
Services and Supplies	92,825.00	101,257.75	(- 8,432.75)
Capital Outlay Equipment	9,490.00	12,153.34	(- 2,663.24)
Total Department	\$833,652.00	\$838,787.11	(- 5,135.01)

Number of Budgeted Positions - - - - - 116.4

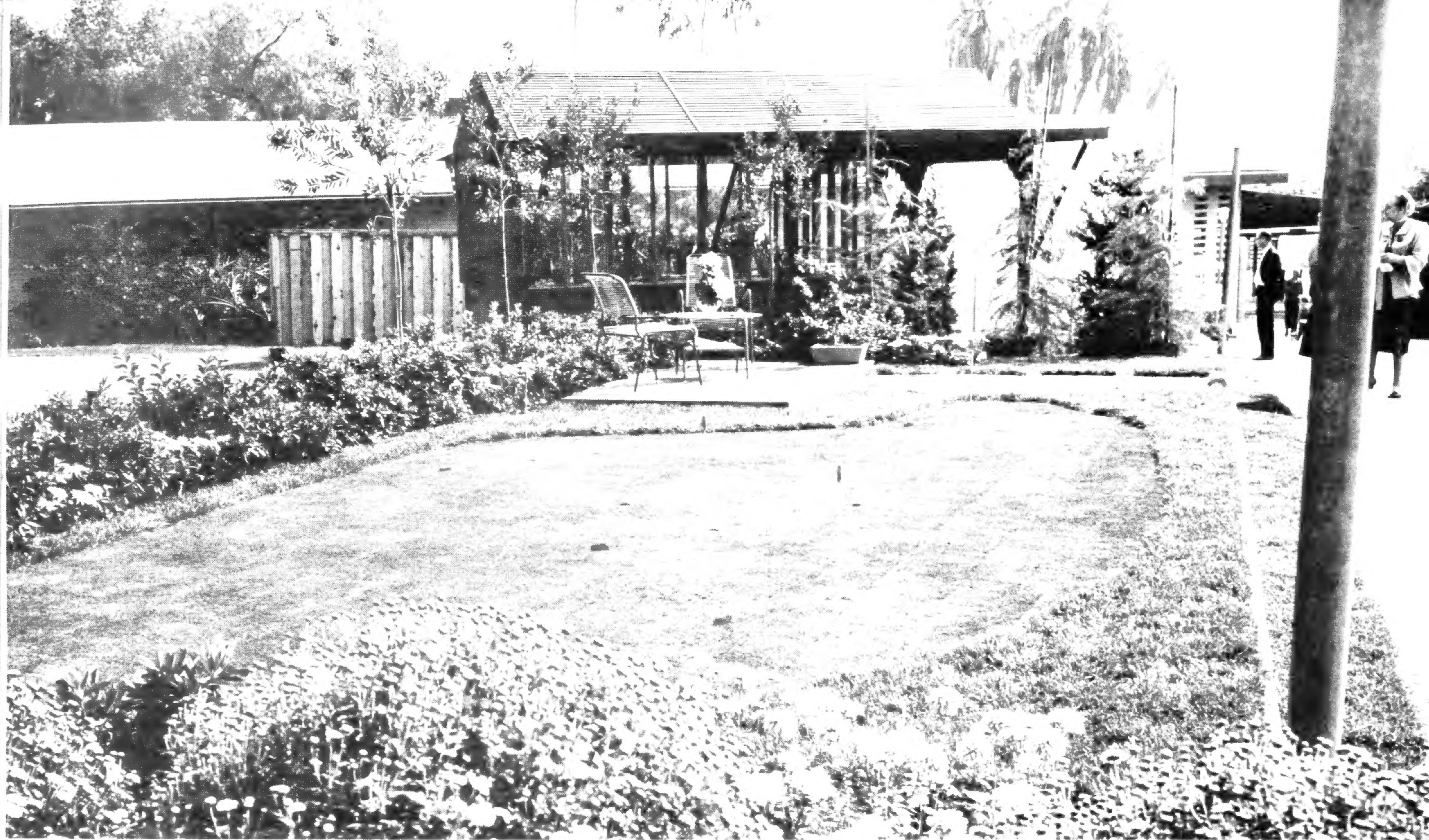
1964-65

	<u>Appropriation</u>	<u>Expenditure</u>	<u>Balance</u>
Salaries and Wages	\$755,230.00	\$762,168.01	(- 6,938.01)
Services and Supplies	102,062.00	99,238.90	2,823.10
Capital Outlay Equipment	6,383.00	4,886.83	1,496.17
Total Department	\$863,675.00	\$866,293.74	(- 2,618.74)

Number of Budgeted Positions - - - - - 119.3



Arboretum's Palm and Bamboo Section depicts several of a fine collection of plants.



A typical entry in the annual Fall Flower Show enhances the Arboretum grounds.



Flowering plum trees are a springtime feature for the Herb Garden at the Arboretum.

